

AbstractID:9472 Title : Characterization and Evaluation of the Varian 2.5mm HD120@ High-Definition MLC

Recently, a new MLC has been offered by Varian Medical Systems for complex high resolution static and IMRT field delivery. The MLC has 2.5 mm wide leaves spanning an 8 cm length over isocenter with abutting 7 cm sets of 5 mm leaves. MLC Transmission Factors (TFs) were measured for a 10x10 cm field using a diode array. The transmission values were calculated for each diode within the field then averaged. The average TF values were 1.02% and 1.20% for the 6 MV and 10 MV beams, respectively. The value measured for the Millennium-120 (5 mm leaves, 6 MV) of 1.4% was greater. Film and ion chamber measurements produced similar results. The Dosimetric Leaf Gap (DLG) was measured using a 0.6 mm diameter diode (IBA). Subsequently, the DLG value was adjusted to optimize the agreement between planned and measured dose distributions. Final values of 0.04 cm and 0.05 cm were used for the 6 MV and 10 MV, respectively. Fluence patterns were compared for different MLC leaf widths. The HD120 produced very smooth fluences with superior resolution. Furthermore, fluence delivery was accurate with no more tongue-and-groove effect than that observed for wider leaves. A 2D dose distribution for a 9-field, 6 MV, Nasopharynx IMRT plan was measured using film (E DR2, Kodak) and compared to the planned distribution for both the HD120 and Millennium-120 MLCs. The planned and measured dose distributions agreed very well and similarly for both MLC models. A complex Ethmoid sinus IMRT case was planned three times for MLC leaf widths of 2.5, 5 and 10 mm using identical optimization constraints. The HD120 plan produced the sharpest dose fall-offs, best optical lens and brainstem sparing and the most homogeneous PTV coverage. The HD120 is mechanically stable, provides superior treatment plans and delivers accurate fluences.